SCIENCE foundation ARIZONA

Innovation at Work

December 14, 2009

The Honorable Jan Brewer
Governor of Arizona
1700 West Washington
Phoenix, Arizona 85007

Subject: Annual Report, Mathematics or Science Achievement Grant (MSAG) Program

Reference: A.R.S §15-720.01 and Arizona Department of Education RFP No. ED08-0036

Dear Governor Brewer,

In accordance with A.R.S §15-720.01(C), please find attached the annual report from Science Foundation Arizona (SFAz) for the Mathematics or Science Achievement (MSAG) program.

The Arizona State Board of education awarded SFAz the contract to administer the MSAG program in 2008. SFAz continues to accelerate Arizona students' competency and excellence in Science, Technology, Engineering and Mathematics (STEM), and in 2008 launched its STEM Initiative (SFAz STEM) and has impacted over 54,000 students and almost 700 teachers across the state. The SFAz STEM Initiative is committed to being a vital bridge between business and those working to advance education in our state by enhancing relevant and effective STEM opportunities for all Arizona students.

The MSAG program is now underway with six awards made in Fall 2009 after a comprehensive solicitation and global peer-review process administered by SFAz. We will continue to monitor the progress of these programs and will provide more detailed student achievement data for mathematics or science in next year's annual report.

Please do not hesitate to contact me should you have any questions.

Sincerely,

William C. Harris
Science Foundation Arizona
President and CEO

cc: Jacob Moore, President, State Board of Education
Robert Burns, President, State Senate
Kirk Adams, Speaker of the House of Representatives
John Kavanagh, Chairman, Joint Legislative Budget Committee
Ken Bennett, Secretary of State
GladysAnn Wells, Director, Arizona State Library, Archives and Public Records

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Mathematics or Science Achievement Grant (MSAG) Program
Annual Report
Science Foundation Arizona
December 15, 2009

Introduction

On July 8, 2008, and on behalf of the State Board of Education (SBE), the Arizona Department of Education (ADE) Procurement office awarded Science Foundation Arizona (SFAz) a contract to coordinate and administer a legislated appropriation of $2.5 million for Mathematics or Science Achievement Grants (MSAG). Simultaneous to this award, SFAz expanded its already successful K-12 education grant programs by creating a STEM Initiative (SFAz STEM) to strategically focus on Science, Technology, Engineering and Mathematics (STEM) education in Arizona.

As noted in statute 15-720.01, the purpose of the MSAG program is to "*promote improved pupil achievement in mathematics or science by providing supplemental funding for innovative mathematics or science programs.*" The statute also states that we shall "*develop application procedures, selection criteria and minimum performance standards,*" and each year, "*submit an annual report concerning each grant recipient's program...*" Also required is an evaluation of the effectiveness of the program and a comparison of the annual academic achievement of pupils participating in MSAG programs with those in comparable schools and not in an MSAG program.

This report serves as the first Annual Report and reflects the following timeline:

July 8, 2008	- Contract Term start date
September 4, 2008	- SFAz STEM start date
Oct. – December, 2008	- Developed a Request for Proposals (RFP) Document
December 2, 2008	- Received Payment from SBE
January 9, 2009	- Announced the RFP
January 30, 2009	- Received 46 Letters of Intent
February 9, 2009	- Invited 23 applicants to submit full proposals
March 16, 2009	- Received 21 full proposals
April 20-21, 2009	- Global, External Peer Review Panel selected awardees
May 8, 2009	- SFAz Board of Directors approved slate of six (6) grantees for recommendation to the SBE
June 22, 2009	- SBE approved six (6) grants recommended by SFAz
June 23, 2009	- Notified potential awardees by email with a list of contingencies for them to respond to for award.
June – September, 2009	- Conducted site visits (or reverse site visits) with each potential grantee to discuss approaches to meeting contingencies.
Oct. – November, 2009	- Mailed Award Letters and Award Checks
Nov. – December, 2009	- Conducted Media Events to announce each awarded MSAG program

Solicitation Process

SFAZ STEM prepared an RFP that solicited proposals to ultimately impact all students, provide innovative and effective ways to increase students' math or science skills, and focus on STEM education in three strategic areas:

1. STEM teacher recruitment and retention, preparation and professional development;
2. Systemic policies and actions that bring to scale efforts enhancing the quality and availability of STEM learning opportunities for students (either in-class or out-of-school time learning);
3. Articulation and coordination between K-12 and post-secondary entities.

The RFP was announced through e-mail dissemination on January 9, 2009 to all SFAz and SFAz STEM contacts as well as through an email communication tool that distributes information to all our stakeholders. The announcement was also posted on the website, www.sfaz.org

On January 30, 2009, SFAz received 46 Letters of Intent that were reviewed by the SFAz staff. Of these, 23 were invited by e-mail on February 9 to submit full proposals. On March 16, 2009 SFAz received 21 full proposals by mail or by delivery in person. The Principal Investigators (PIs) for these proposals represented schools, school districts, colleges, universities, and government agencies. Throughout this solicitation process, SFAz staff was available to answer questions pertaining to submission logistics and proposal format.

Review Process

SFAz implemented a global, peer review process that mimics the peer reviews conducted at the National Science Foundation (NSF). Five experts from outside the Phoenix area were invited to serve on the Peer Review panel; they represented the following institutions:

1. Research Corporation for Science Advancement, Tucson, AZ
2. Exploratorium, San Francisco, CA
3. University of California, Los Angeles, CA
4. State University of New York at Stony Brook, NY
5. Norfolk State University, Norfolk, VA

The 21 proposals were read and reviewed in advance by the five members of this extramural panel of experts who then convened in Phoenix at SFAz to discuss, evaluate, recommend and rank the proposals for purposes of advising SFAz STEM to FUND or NOT FUND a proposal. Each proposal was assigned to one primary reviewer/discussion leader, one secondary reviewer/supporting the discussion, and one tertiary reviewer/scribe. In this way, each proposal was guaranteed three independent reviewers in discussion. All of the MSAG proposal reviews were returned to SFAz prior to convening the panel discussions. The Panel met on Monday and Tuesday, April 20-21, 2009 at SFAz. All the panelists participated in in-depth discussions on the proposals and reviews; final summaries were written on each proposal, reviewed, edited, and agreed upon by the

panelists. Six programs, listed here with the Principal Investigators (PI), were recommended for funding.

1. "Discovering the Dragonfly Larvae for Every Child: Wetland Based Outdoor Classrooms in Navajo County," Gillespie, L., Navajo County Education Service (Pilot Project).
2. "Engineering 102 in High Schools," Goldberg, J., University of Arizona.
3. "Harnessing the Power of Data (POD)," Rubino-Hare, L., Northern Arizona University.
4. "Challenger Space Center North," Kelly, M., Challenger Space Center and Brown, K., Flagstaff Unified School District.
5. "Metro LEADS Leading EcoExplorations And Demonstrations of Sustainability," McDonald, K., MetroTech High School.
6. "Bioregional Outdoor Education Project (BOEP)," Ross, J., Four Corners School of Outdoor Education (Pilot Project).

On May 8, 2009, these programs were presented to the SFAz Board of Directors. After extensive review and discussion, each one was approved, and with varying contingencies. The Program Officer subsequently notified the PIs by email of the potential of their award and listed the contingencies that each PI needed to address in order to receive the award. Awards were granted at the conclusion of site (reverse site) visits in August-September during which SFAz team members met with the PIs and their project teams to better understand the respective approaches for producing program deliverables. Award letters were sent in October and November.

Program Summaries

Program abstracts with corresponding fund amounts, the grantee to whom these funds were given, and the PI who will administer the grant are described as follows:

"Discovering the Dragonfly Larvae for Every Child: Wetland Based Outdoor Classrooms in Navajo County"

Principal Investigator: Lannie Gillespie, Agency Director, Navajo County Education Service
Grantee: Navajo County Education Service
Awarded Amount: $50,000 planning grant for one year
Abstract: A planning grant aimed at creating a natural environment for K-12 teachers and students to learn Science, Math and Technology. Based on sites created in four locations in Navajo county these wetlands would become community outdoor classrooms. The outdoor classroom would be the means for teachers to receive specific content instruction in Science, Math and Technology along with appropriate pedagogy. This instruction will assist each teacher to take their students through an inquiry based learning process utilizing the natural resources readily available with each wetland ecosystem.

"Engineering 102 in High Schools A Partnership Between UA Engineering and Arizona High Schools"

Principal Investigator: Jeffrey B. Goldberg, Dean, College of Engineering at University of Arizona (UA)
Grantee: Tucson Unified School District
Awarded Amount: $500,000 total for two years (expansion to 20 schools)
Abstract: This proposal extends an engineering experience at Chandler Hamilton High School, modeled after UA freshman engineering design experience – ENGR 102. Chandler High students enroll as students of the University of Arizona and obtain 3-units credit towards engineering degrees. Current participating high schools are Hamilton in Chandler, Brophy in Phoenix, and in the Tucson area: Sabino, Flowing Wells, Mountain View, and Ironwood Ridge. The goal is to replicate this model in 20 more Arizona high schools over the next two years. The project includes teacher training, classroom materials, UA support, the creation of an online teaching community, and evaluation. The goal is to increase students matriculating and succeeding in engineering programs at all three Arizona Universities and Embry-Riddle, and nationwide.

"Harnessing the Power of Data: The POD Project Northern Arizona University Center for Science Teaching and Learning"

Principal Investigator: Lori Rubino-Hare, Professional Development Associate, Northern Arizona University
Grantee: Coconino Association for Vocation Industry and Technology (CAVIAT)
Awarded Amount: $400,000 total for two years
Abstract: Harnessing the Power of Data (POD) will increase science, technology, and math skills through problem-based learning modules in which students solve problems through data collection and analysis utilizing geospatial technologies. Professional development is provided for 30 pairs of secondary Career and Technical Education (CTE) and mathematics or science content teachers to implement Legacy Cycle modules and develop their own lesson plans. Participants then examine the effectiveness of the modules on learning and on science and technology efficacy of 1200 secondary students.

"Challenger Space Center North: Establishing a Northern Arizona STEM Education Hub Featuring Spaceflight Mission Simulations"

Principal Investigator: Mary Lynn Kelly, Executive Director, Challenger Space Center and Kevin Brown, Superintendent, Flagstaff Unified School District
Grantee: Flagstaff Unified School District
Awarded Amount: $500,000 total for two years
Abstract: To establish a regional science hub in Northern Arizona, Flagstaff Unified School District and Challenger Space Center of Arizona collaborate to establish a STEM Skills Center in Northern Arizona, featuring a $750,000 Spaceflight Mission Simulator provided by Challenger. "Challenger Space Center North" will provide vital experiential learning opportunities for K-12 pupils in Flagstaff and surrounding rural communities. The Center will offer high-quality teacher professional development, including participatory opportunities for pre-service teachers through

Northern Arizona University NAU Teach program and elements of Master of Arts and Science Teaching Degree.

Metro LEADS Leading EcoExplorations And Demonstrations of Sustainability

Principal Investigator: Kate McDonald, Principal, Metro Tech High School
Grantee: Phoenix Union High School District
Awarded Amount: $900,000 total for two years
Abstract: This proposal will support the integration of math and science content into the high school curricula using best practices that include hands-on, project-based learning centered in sustainability. Students will apply math and science skills as they research, design, and construct projects that model sustainable technology. Features include focused staff development, collaboration, and support for highly effective teaching practices, increased student achievement and interest in STEM related studies and careers, and student initiated projects of sustainability resulting in Metro Tech as a model "green" school.

"Bioregional Outdoor Education Project (BOEP)"

Principal Investigator: Janet Ross, Executive Director, Four Corners School of Outdoor Education
Grantee: Montessori Charter School of Flagstaff
Lolita Paddock, Principal, Leupp Schools, Incorporated Elementary School
Sharlene Navaho, Principal, Dzil Libei Elementary School
Awarded Amount: $50,000 planning grant for one year
Abstract: The BOEP planning grant will meet STEMAz program challenges for four AZ schools and 16 AZ teachers: 1) extending teacher's best practices through peer leadership and quality teaching partnerships; 2) integrating math and science across the curriculum; 3) Integrating hands-on experiences inside and/or outside the classroom with STEM professionals; and 4) Involving parents and the community through outreach and/or direct participation. The BOEP will model improved STEM teacher professional development that includes appropriate 21st century skills training in problem-solving, creative thinking, and scientific reasoning in K-8 public and BIA Arizona schools within the four-state (NM, UT, CO, AZ) bioregion of the Colorado Plateau.

Funding Levels			
Principal Investigator	**Year 1**	**Year 2**	**Total**
Gillespie	$50,000	$0	$50,000
Goldberg	$250,000	$250,000	$500,000
Hare	$200,000	$200,000	$400,000
Kelly	$250,000	$250,000	$500,000
McDonald	$450,000	$450,000	$900,000
Ross	$50,000	$0	$50,000
SFAz Administration	**$85,500**	**$14,500**	**$100,000**
TOTAL			**$2,500,000**

Award Process

All awards were granted subject to the contents of the SFAz Terms and Conditions (T&C), which stipulate quarterly deliverables including progress reports and expense reports. The T&C also stipulate that an interim report and site visit may be requested. Annually, each grantee is required to submit a Metrics Report. After the completion of the program, a Final Report and an Expense Report for the entire grant are required. The dates of delivery were delineated in a schedule that accompanied each grantee's award letter. All scheduled payments to the grantee's Sponsored Projects Organization are made in response to receipt of the quarterly progress reports and expense reports. SFAz uses GIFTS Software (Global Integrated Funds transfer and Telecommunications System) to record and track its grant awards.

Rollout of Awards

After the Award Letters were sent out, SFAz scheduled Media Events with each grantee to formally announce the MSAG awards. The Press Releases are attached for the following announcements that have been made to date:

September 11, 2009 - "Wetland Based Outdoor Classrooms in Navajo County" was awarded to the Navajo County Education Service and announced at a gathering in Show Low where they were celebrating the 30th anniversary of the wetlands' creation. The State Board of Education presented at this event where local elected and school officials were also in attendance.

November 9, 2009 - "Metro LEADS: Leading EcoExplorations and Demonstrations of Sustainability" was awarded to Metro Tech High School and announced at a gathering of students, teachers, administrators and dignitaries at Metro Tech High School. The President of the State Board of Education presented at this event which was also attended by Phoenix Mayor Gordon, State Senator Debbie McCune Davis, and the Phoenix Union High School District Superintendant.

November 18, 2009 - "Challenger Space Center North" was awarded to Flagstaff Unified School District and announced at a gathering at the District office where there was a gathering of students and administrators. In attendance was the State Board of Education, the Coconino County Schools Superintendent, Flagstaff Mayor Presler and the Flagstaff Unified School District Superintendent.

December 1, 2009 - "Engineering 102 in High School" was awarded to the Tucson Unified School District and announced at a gathering in the Mechanical/Aeronautical Engineering Courtyard outside the University of Arizona's College of Engineering. Attending the announcement was a State Board of Education member and Amphi School District Superintendent as well as three members of the Arizona State Legislature.

December 9, 2009 was scheduled in Flagstaff and Tuba City to announce the last two program awards, Hare's "Harnessing the Power of Data: The POD Project" in Flagstaff and

Ross' "Bioregional Outdoor Education Project (BOEP)" in Tuba City. However, due to inclement weather and closed roads in the area, these two media events have been postponed to January 2010.

Evaluation and Assessment

Since these MSAG programs have just recently been awarded, students, schools and teachers will begin active participation in the 2010 calendar year. We anticipate an evaluation of effectiveness of the awarded programs to be available for the next annual report. Currently, SFAz is developing a comprehensive approach to producing this information.

SFAz has contracted with Battelle Technology Partnership Practice (Battelle), a nationally-recognized entity created by its parent company, Battelle, to serve economic development organizations, universities, and non-profit technology organizations across the United States. Battelle provides SFAz with an independent assessment of progress accompanied by an annual report from which to learn and adapt, ensuring progress and performance. Part of this assessment has included a review of the education grants that SFAz has awarded in the past including numbers of teachers and students participating in these programs and the percent that are Native American.

The approach in the MSAG project is to build upon this already-developing Arizona-wide, STEM metrics and assessment database of "common metrics" that can be measured in aggregate. While these common metrics are not a substitute for individual grant and program evaluation, they provide an additional means for assessing the performance and significance of SFAz's overall efforts in advancing STEM education in Arizona. SFAz is working closely with Battelle to enhance this comprehensive approach to measuring common metrics and will include those measures from the MSAG programs.

In addition to this aggregate assessment, we will carefully monitor the methodologies that each MSAG program has proposed to conduct their program evaluations. From these, SFAz and Battelle will develop a common assessment for the MSAG grants to be able to collectively determine the effectiveness of these programs on student achievement. SFAz will work with Battelle to determine how best to conduct an MSAG-wide, collective assessment that will demonstrate the effectiveness of these innovative programs on improved student achievement in mathematics or science. The methodology and corresponding results will be presented in next year's annual report.

Over the course of the next year, SFAz will monitor the progress of the six programs that have been awarded a total of $2.4 million over a two-year period. The intent is to be able to demonstrate that the programs that have been selected for these funds indeed promote improved student achievement in mathematics or science.

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For Immediate Release

Navajo County Education Service Agency Receives Science Foundation Arizona Planning Grant to Further Science and Math Learning in Local Schools

Wetlands become "Outdoor Classrooms" that develop Science, Technology, Engineering and Math (STEM) skills

SHOW LOW, AZ September 11, 2009 – Students throughout Navajo County will soon be able to engage in hands-on science instruction outside their regular classroom to study various life cycles and biological environments thanks to a $50,000 planning grant from Science Foundation Arizona and the Arizona State Board of Education. Navajo County Education Service Agency will receive the Mathematics or Science Achievement Grant (MSAG) award to develop an interactive, outdoor science program that incorporates the study of local wildlife that thrive in the wetlands of Pintail Lake (Show Low), Jacques Marsh (Lakeside), and the two created on the Hopi reservation at the village of Polacca and Kykotsmovi.

Science Foundation's goal in awarding the competitive grant is to support highly innovative, inquiry-based instruction that brings science, technology, engineering and math (STEM) learning to life for students and stimulates interest in science and technology careers. The rich wetland ecosystem in Navajo County has evolved over the last 30 years to become a diverse habitat for insects, fowl, plants and wildlife that serve critical hydrological and ecological functions. This setting provides a unique rural Arizona environment that enriches a biology curriculum.

The Navajo County Education Service Agency will use the MSAG funds to create an outdoor, wetlands-based science curriculum that teachers can utilize at four specific locations to benefit K-12 students in Show Low, Pinetop-Lakeside, across Navajo County, and the Hopi Reservation. The off-site program will provide a seasonal, dynamic curriculum and introduce new ways for young people to grasp scientific concepts incorporating living study subjects in their natural habitats.

"This interactive, wetlands-based curriculum is an excellent way for young people to become excited about science and its many applications," said William C. Harris, president and CEO of Science Foundation Arizona. "I am especially pleased to see that rural Arizona communities are exploring the use of their own local resources and amenities as 'classrooms' to teach these skills that we hope will build interest and skill sets toward careers in science and technology."

"These creative types of programs that we support are having an impact in schools across Arizona," said Darcy Renfro, executive director of Science Foundation's STEM Education Initiative. "Teachers and other educators know the importance of keeping today's students interested in STEM-related courses and this interactive biological environment encourages student learning with their own innate curiosity as the driver."

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"This is exciting for educators here in Navajo County and we are looking forward to building a high-quality science curriculum utilizing this important resource, the wetlands," said Lannie Gillespie, director of the Navajo County Education Service Agency.

Gillespie with the Education Service Agency is one of six that were chosen for MSAG funding. Successful proposals vying for funding were submitted to Science Foundation and required to comprehensively address STEM education goals focused on systemic change that have the potential to impact students statewide. The grant is being formally announced on Friday, September 11th at a gathering in Show Low celebrating the 30th anniversary of the wetlands' creation.

The wetlands were created in the late 1970's by the U. S. Forest Service as a natural way to treat effluent from two local communities and have become a point of pride for Navajo County for their function and beauty.

About Science Foundation Arizona: Science Foundation Arizona (SFAz) is a 501(c)(3) non-profit organization initiated in 2006 by the Greater Phoenix Leadership Inc., Southern Arizona Leadership Council and the Flagstaff Forty with the goal to build and strengthen the scientific and education infrastructure in areas of greatest strategic importance to Arizona's competitiveness in the global economy. These areas comprise advanced communications, biomedicine and sustainable systems that include renewable energies. The state has appropriated monies through the Arizona 21st Century Competitive Initiative Fund and these research grants, totaling $60 million in the first two years, was leveraged to $169 million by attracting outside capital. SFAz continues to accelerate Arizona's students' competency and excellence in STEM education and has to date impacted 54,000 students statewide. SFAz serves as a facilitating bridge between industry and education that ensures a highly skilled Arizona work force as the foundation for a 21st century knowledge-based economy. For more information, visit www.sfaz.org

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For Immediate Release
Monday, November 9, 2009

Phoenix Metro Tech High School Wins Science And Math Education Grant To Implement First In Arizona Interactive Sustainability Curriculum

Innovative Program to Tie in Hands-On Training for "Green Collar" Jobs

(Phoenix, AZ) – Phoenix Union District's Metro Tech High School will receive a two-year, $900,000 grant to implement a unique curriculum based on innovation in sustainability careers. The first-of-its kind program will not only provide an opportunity for students at the urban high school to learn the basics of sustainability (recycling, renewable energies, etc.), it will also give them the chance to use what they are learning to engage in interactive planning, development and implementation of "green" projects.

The Math or Science Achievement Grant (MSAG) is funded by the Arizona State Board of Education and awarded by Science Foundation Arizona Science, Technology, Engineering and Math Initiative (SFAz-STEM). Metro Tech's winning program, titled "Leading EcoExplorations and Demonstrations of Sustainability" (LEADS) was chosen as a grant recipient because of its emphasis on using math and science in real-life applications that expose students to STEM learning and STEM careers. "Green collar" jobs, or those in sustainable industries and renewable resources, are becoming increasingly important to the nation's and state's economy, as the demand and need for renewable and energy efficient services and products grow.

Metro LEADS is in its early stages, and the students are already hard at work, building small, scalable energy efficient structures, including a doghouse constructed of adobe, straw and other repurposed and recycled materials. The doghouse recently won a Desert Doghouse contest, hosted by Arizona State University's College of Engineering and the Del E. Webb School of Construction, and is being displayed at this week's national "Greenbuild 2009" conference in Phoenix.

The Metro LEADS program will create a new learning environment that combines career and technical education (CTE), community and family engagement and peer mentoring of younger students enabling participants to take what they learn in school and apply it to current and future real-world situations. Additionally, Metro LEADS students will be required to implement models of sustainability on campus, reducing energy costs and water consumption and increasing recycling efforts through their work. Art and fashion program students will incorporate repurposed and recycled materials into their creations, a water bottle refilling station will be set up on campus and students will conduct energy audits on campus and at home. As the curriculum progresses, students will tackle more challenging assignments that will enable them to build a 21st century skill set, critical for success in the global economy.

"We are pleased to see Metro Tech implementing this program, which is exactly what these grants were intended to do," said Jacob Moore, President of the Arizona State Board of Education.

"LEADS will expose many students to an invaluable educational experience, and a career path they might not have considered otherwise."

"The Metro LEADS program will enable students to transition from high school to college, trade school and careers, since it utilizes a hands-on approach to hone the skills necessary for the knowledge-based economy," said William Harris, President and CEO of Science Foundation Arizona.

Metro Tech is a comprehensive public high school that offers two-year career and technical education (CTE) courses to juniors and seniors. The school serves approximately 1350 full-time students each year, as well as more than 1700 through sister schools. Reach for the Metro LEADS program is estimated to reach more than 7,000 Phoenix-area children (including elementary and middle-school students) over the course of three years.

"These practical approaches will help underscore the importance and bring context to mathematics and science. Students will *experience* these subjects, not just memorize facts," said Darcy Renfro, executive director of SFAz-STEM. "This is exciting – it will be one of the more hands-on and true learning experiences involving STEM careers in place, and could eventually be emulated at schools across the state."

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For Immediate Release

Flagstaff Public Schools, Challenger Space Center Receive Two-Year Competitive Grant for Innovative Rural Science Program

New Program Lifts Off to Support a Northern Arizona STEM Education Hub for Teachers, Students

(Flagstaff, AZ - November 18, 2009) – Flagstaff Unified School District and the Challenger Space Center will receive a two-year, $500,000 competitive grant to establish a regional science, technology, engineering and mathematics (STEM) skills hub in Northern Arizona. The center, known as "Challenger Space Center North," will focus on providing hands-on, immersive learning experiences for K-12 students and professional development for teachers throughout the district.

"Challenger Space Center North" will house a state-of-the-art spaceflight mission simulator that will engage students from grades 5 – 8 in experiencing a simulated space mission to the moon, Mars, or an interplanetary comet. These budding astronauts will be building important STEM skills as they transfer information, conduct experiments, transmit images and analyze data. "Such a center in Northern Arizona couldn't come at a better time," said Cecelia Owen, Coconino County Schools superintendent and member of the Arizona State Board of Education. "When school budgets are getting smaller, STEM instruction is more important than ever as educators still have to find creative ways to teach critical math and science skills."

Math or Science Achievement Grant (MSAG) funding comes from an allocation to the Arizona State Board of Education with the grants administered and overseen by Science Foundation Arizona's STEM Initiative (SFAz STEM). The MSAG winners were selected through a competitive review process based on the most innovative proposals to advance math and science achievement throughout Arizona.

In addition to serving students from Flagstaff Unified, the Center's programs will eventually be available to children in the surrounding areas including the Navajo and Hopi Nations and other rural communities. More than 11,000 K-12 students are slated to benefit from the Center's offerings that develop critical thinking and problem-solving ability – key skills necessary to compete successfully in the 21st century.

"Offering students a chance to be a part of Mission Control is a sure-fire way to get them excited about science," said Flagstaff Mayor Sara Presler. "We know that helping children in the younger grades enjoy science and mathematics is key to getting them interested in STEM-based fields. Students now have access to curricula that will challenge them, stimulate their natural curiosity, and prepare them well for college and careers in the global economy. This is a great asset for Flagstaff and all of Arizona."

(more)

Rural teachers further benefit from professional development programs and workshops at Challenger Space Center North that highlight new ways of presenting STEM material in the classroom along with opportunities to exchange ideas and best practices among peers. Ongoing training and professional development of teachers at all levels is essential to ensure both the educators' and students' success.

"Building a 21st century skill set through STEM education is essential to virtually every industry in today's economy. Students develop those skills more readily when they can apply math and science through hands-on, project-based experiences rather than just memorizing facts and figures," said Darcy Renfro, executive director of SFAz-STEM. "This Center will give local students that experience, and serve as an exciting and invaluable curriculum and community engagement tool for Northern Arizona."

"Expanding into Northern Arizona provides a wonderful new opportunity for the Challenger Space Center to continue inspiring children to develop a lifelong interest in the STEM skills," said Mary Lynn Kelly, executive director of the Challenger Space Center of Arizona in Peoria.

"This will provide a definite advantage for our local and regional students," said Kevin Brown, superintendent of Flagstaff Unified School District. "Northern Arizona has many assets already in place to enable STEM learning – the University, Lowell Observatory, and a supportive business community – this Center is an important catalyst for tying all of these together to give students a superior STEM experience."

The Flagstaff Schools – Challenger Space Center grant is the third of six competitive MSAGs that are being funded. Prior grants were awarded to Navajo County Education Service to plan for an outdoor curriculum utilizing local wetlands, and to Metro Tech High School to implement a campus-wide sustainability program. Additional awardees will be announced in December.

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For Immediate Release

Science Foundation Arizona Awards Math and Science Achievement Grant to Launch Innovative High School Engineering Program

Tucson Unified School District and the University of Arizona receive grant to build statewide pathways for students' preparedness in engineering careers

(December 1, 2009 - TUCSON, AZ) Tucson Unified School District (TUSD) in partnership with the University of Arizona College of Engineering (UA) has won a two-year, competitive Math or Science Achievement Grant (MSAG) awarded by Science Foundation Arizona (SFAz) and funded through the State Board of Education. The grant supports the district and other schools across the state to implement a new program geared toward increasing engineering graduates at Arizona colleges.

The TUSD-UA program incorporates an innovative approach involving high school and higher education institutions as collaborative partners to increase the pipeline of qualified engineers throughout Arizona. Piloted at Chandler Hamilton High School in metro Phoenix, *Engineering 102* will expose students to hands-on courses at UA and allow them to simultaneously enroll in engineering classes at their high school and the university.

High school students at participating schools can now elect to jump start their university studies and earn three credit hours toward an engineering degree. A recent ranking report released by salary compensation data company, *PayScale*, indicated that seven of the ten highest starting salaries for college majors are within the engineering sector, with starting salaries for some of these graduates exceeding $60,000.

Employers in Arizona have repeatedly voiced concern that they have difficulty filling jobs that call for engineers because of the low number of graduates, compounded by heavy competition among employers for qualified personnel. While Arizona ranks near the top in terms of need for science and engineering graduates, it ranks near the bottom in supplying qualified workers.

The grant funds will facilitate the expansion of the program to 20 high schools across the state with curriculum materials, as well as support from UA's engineering department through online tools, teacher professional development and evaluation. *Engineering 102* will be overseen by Dr. Jeff Goldberg, dean of the UA College of Engineering.

"It is incumbent upon us to teach material in an inviting and professional manner so students can learn the concepts and how to apply them as they move on to a successful career," said Goldberg. "Implementing *Engineering 102* in high schools is a potential method to increase the pipeline flow of much-needed engineers, as students experience engineering in a safe and familiar environment."

(more)

"The backbone of Arizona's growth and ability to compete in the 21st century is dependent upon smart people with technical expertise," said William C. Harris, President and CEO of Science Foundation Arizona. "Teachers can now be trained to deliver college level curriculum to their high schools student to prepare them for both the rigorous academic demands of college and the numerous exciting careers that await them upon graduation."

"These math and science grants are funding critical programs that are key to the success of students, and in turn, to the community and state," said Dr. Vicki Balentine, member of the State Board of Education. "The head start these high school students will have as a result of this partnership is an important one – for them and for all of Arizona – as we increase the number of qualified graduates for tomorrow's workforce."

"We need to ensure at every level that we have effective education to guarantee adequate numbers of engineers and students trained in technical specialties who can meet the growing needs of Arizona industry to compete effectively – both nationally and globally," said Arizona State Representative Frank Antenori of Tucson.

"In this global economy, industry will move where they have the best and brightest - with engineering talent being key," said Darcy Renfro, executive director of Science Foundation Arizona's Science, Technology, Engineering and Mathematics Initiative (SFAz STEM). "If Arizona is to compete for industry investment and for that brain power, then we have to focus on programs like this one that will ensure the crucial human capital component. Not only will this program support Arizona's economic security, but it will effectively help in preparing students for success in college and careers."

The TUSD-UA proposal is one of six among a pool of 28 applications chosen for the highly competitive MSAG awards, all of which are required to undergo a rigorous selection process. SFAz STEM provides fiscal oversight and management of the grant monies to ensure grantees adhere to timelines, funding requirements and established metrics.

Previous MSAG awards have gone to Metro Tech High School in Phoenix for a sustainable energy curriculum, Flagstaff Schools for a Challenger Space Center and to Navajo County Education Service for a STEM-intensive curriculum incorporating native habitats and wetlands.

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About Science Foundation Arizona: Science Foundation Arizona (SFAz) is a 501(c)(3) non-profit organization initiated in 2006 by the Greater Phoenix Leadership Inc., Southern Arizona Leadership Council and the Flagstaff Forty with the goal to build and strengthen the scientific and education infrastructure in areas of greatest strategic importance to Arizona's competitiveness in the global economy. These areas comprise advanced communications, biomedicine and sustainable systems that include renewable energies. The state has appropriated monies through the Arizona 21st Century Competitive Initiative Fund and these grants, totaling $60 million in the first two years, leveraged an additional $109.8 million in outside capital. SFAz continues to accelerate Arizona's students' competency and excellence in STEM education and has to date impacted 54,000 students statewide. SFAz serves as a facilitating bridge between industry and education that ensures a highly skilled Arizona work force as the foundation for a 21st century knowledge-based, global economy. Founding executive leadership groups are funding operating costs for SFAz through 2012, enabling public and philanthropic funds to be directly applied to foundation initiatives. For more information, visit www.sfaz.org